Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Reexamination of Roaming Obligations of	)	WT Docket No. 05-265
Commercial Mobile Radio Service Providers	)	

COMMENTS OF LEAP WIRELESS INTERNATIONAL, INC.

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EXECUTIVE SUMMARY

Leap Wireless International, Inc. and its subsidiaries (collectively, "Leap") submit these comments in response to the Commission's request for input "on issues related to manual and automatic roaming, including issues concerning roaming negotiations, small and rural carrier concerns, and technical considerations."[1]

There are many respects at the retail level in which the Commercial Mobile Radio Services ("CMRS") industry is quite competitive, and where the Commission's recent finding that "U.S. consumers continue to benefit from robust competition in the CMRS marketplace"[2] holds true. However, regional markets for wholesale roaming services present an altogether different competitive snapshot. In many such markets, the net effect flowing from the incompatibility of the major digital wireless standards, Code Division Multiple Access ("CDMA") and Global System for Mobile Communications ("GSM"), is that the nation's largest wireless carriers have a duopoly in the provision of wholesale roaming services.

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[1] Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers, WT Docket No. 05-265, *Notice of Proposed Rulemaking*, FCC 05-160 (Aug. 31, 2005), *summarized at* 70 Fed. Reg. 56,612 (Sept. 28, 2005).

[2] Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, WT Docket No. 05-71, *Tenth Report*, FCC 05-173, ¶ 204 (rel. Sept. 30, 2005) ("*Tenth Annual Report*").

This effective duopoly and the lack of roaming partner choices is a major structural problem within the CMRS industry, and correspondingly, a major problem for smaller and regional wireless carriers and their customers. For example, as discussed in greater detail below, Leap's efforts to introduce an occasional roaming capability to its subscribers have been greatly impeded by large carriers who have refused to negotiate reasonable terms with Leap, even though their services are technologically compatible and they have plenty of available capacity on their networks.

More broadly, the available data show that large carriers demand exorbitant rates for automatic roaming. Indeed, the average *wholesale* roaming rates that the largest wireless carriers charge to unaffiliated carriers exceeds—in some cases by four times—the *retail* rates that these carriers charge retail customers. As the ERS Group observes in its attached report on wholesale roaming pricing methods, "setting roaming prices above prevailing retail rates simply cannot improve total [consumer] welfare; this practice can only reduce total output, limit competition, and limit the options available for consumers."[3] Large carriers also have asked the Commission to bless their refusals to provide automatic roaming service at any price to facilities-based competitors under the guise of an "in-market" exception to automatic roaming coverage.

Consistent with its congressional mandate, the Commission should intervene on a targeted basis to adopt rules that will protect consumers from the effects of such practices and to promote full competition in the CMRS market. Specifically, Leap urges the Commission to adopt the following rules in order to promote competition and to clarify the obligations of CMRS carriers under the Communications Act of 1934[4] ("the Act"):

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[3] "Wholesale Pricing Methods of Nationwide Carriers Providing Commercial Mobile Radio Service: An Economic Analysis" (November 2005) ("*ERS Report*"), at 16 (Attachment A).

[4] 47 U.S.C. §§ 151–615b.

1) The Commission should require facilities-based carriers to furnish automatic roaming service upon the request of another carrier, including a facilities-based competitor, unless the facilities-based carrier adequately demonstrates to the Commission that the service is not compatible with, or there is no available capacity on, its network.

2) Facilities-based carriers should be prohibited from discriminating against similarly-situated carriers in the rates charged for, or the terms and conditions of, roaming service.

3) In areas where there are three or fewer facilities-based carriers from which the carrier seeking automatic roaming service could obtain such service, the Commission should prohibit a facilities-based carrier from demanding rates for automatic roaming that exceed that carrier's average retail revenue per minute for that area.

Leap believes these rules are manifestly in the public interest, and indeed, are compelled by the common carrier provisions of Title II of the Act. Furthermore, the rules will not be costly to enforce and will not impede the growth of facilities-based CMRS service.

I. OVERVIEW OF LEAP WIRELESS INTERNATIONAL AND ITS SERVICES

Leap, through its subsidiary Cricket Communications, Inc. ("Cricket"), has led the wireless industry in offering consumers unlimited mobile wireless services within a local service area for a reasonable flat monthly rate and without requiring its customers to enter into a long-term contract, to meet a credit standard, or to agree to early termination fees. This extraordinary pricing structure brings the benefits of mobile wireless service to many consumers who might otherwise be unable to obtain it. Leap also draws customers who want more predictable bills or who want to avoid large overage charges. Leap has been able to provide high-quality, low-cost mobile wireless service in large part because of its business model under which it (i) has deployed a high capacity, state-of-the-art CDMA network, (ii) has streamlined its operations, and (iii) is able to acquire customers at costs substantially below the costs of other industry leaders.

As of September 30, 2005, Leap served approximately 1.62 million customers in 19 states.[5] Those numbers alone, however, do not reflect Leap's unique customer base. Within this population are many traditionally under-served customers: 69 percent of Leap's subscribers have household incomes of less than $35,000 per year and 40 percent are Hispanic or African-American. The usage patterns of Leap's customers are also vastly different from the usage of customers of other carriers: the average Leap customer uses approximately 1,450 minutes per month (nearly an hour a day, every day), while the industry average is about half that number.[6] Indeed, approximately 50% of Leap's customers no longer have landline phone service, and 90

[5] Declaration of Robert J. Irving, Jr. ("Irving Declaration"), ¶ 3 (Attachment B).

[6] *Tenth Annual Report*, ¶ 199.

percent use Leap as their primary phone service—far outpacing the industry average on both counts.[7]

Historically, Leap's core Cricket services did not include the ability for subscribers to roam. Instead, the Cricket offering was designed to resemble the simplicity and predictability of landline service, with an unlimited supply of mobile minutes for one flat fee while in the local market area. Like many subscribers of local mobile wireless service, however, some of Leap's customers need the flexibility of using their mobile wireless service when they travel—not only for convenience but for the added safety they can obtain through ready access to mobile phone service when they are away from their home market.

In response to this demand, Leap recently has sought to expand Cricket's service offerings to provide its customers with roaming capabilities that meet their needs for occasional roaming. In June, 2005, Leap announced the roll-out of its Travel Time™ roaming service, a product designed to allow the occasional roamer to use Cricket phones across the United States on a prepaid basis.[8] Leap's goal is to include automatic roaming[9] in as many out-of-network areas as possible at a reasonable per-minute rate.

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[7] Irving Declaration, ¶ 3; *see also Tenth Annual Report.*, ¶ 196 & n.492 (citing surveys reporting that, for second half of 2004, approximately six percent of adults lived in households with only wireless phones; *id*., ¶ 197 (2004 survey showed that nine percent of all households receive almost all their calls wirelessly).

[8] Currently, Cricket customers can sign up for 30 minutes of Travel Time per month for a $5 monthly recurring charge with airtime above 30 minutes deducted from their "Flex Bucket" account at $0.59 per minute. Irving Declaration, ¶ 4.

[9]Historically, manual roaming has never been an attractive or widely used option for CMRS subscribers. This holds particularly true for Leap's customers, many of whom are credit-challenged and, without a credit card, have no practical way of making a manual roaming call. Irving Declaration, ¶ 8.

II. CURRENT CMRS MARKET CONDITIONS DO NOT PERMIT A LARGE SEGMENT OF WIRELESS CONSUMERS TO OBTAIN AUTOMATIC ROAMING ON A COMPETITIVE BASIS

The Commission has repeatedly affirmed that roaming services are "important to the development of nationwide, ubiquitous, and competitive wireless voice telecommunications."[10] In this section, Leap describes the current CMRS market conditions and then explains why, in this environment, consumers seeking automatic roaming to augment a local coverage area—rather than subscribing to a plan that offers nationwide coverage—cannot rely upon competitive forces to provide this critical service.

In a competitive marketplace, Leap (along with other regional, small, and rural carriers) would be able to enter reasonable automatic roaming agreements on behalf of its customers at reasonable and non-discriminatory rates, and consumers who do not want constant nationwide service would be able to choose a local plan with reliable and affordable roaming. Under present market conditions, however, these consumers are forced to make a Hobson's choice: they must either pay too much for the periodic out-of-area coverage they seek or forego the option of using their phone outside of their local service areas. Consumers deserve a better, and a more competitive, choice.

A. The Largest Carriers Have an Enormous Share of the CMRS Market

In its *Tenth Annual Report* to the Congress, the Commission appeared optimistic about the competitive health of the CMRS industry. It observed that, even "with fewer nationwide mobile telephone carriers to choose from, U.S. consumers continue to benefit from robust

[10] Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, CC Docket No. 94-54, *Second Report and Order and Third Notice of Proposed Rulemaking*, 11 FCC Rcd. 9462, 9464, ¶ 2 (Aug. 15, 1996) (addressing importance of roaming on broadband wireless networks); *see also* Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Notice of Proposed Rulemaking*, 15 FCC Rcd. 21,628, ¶ 15 (Nov. 21, 2000) ("We affirm our conclusion … that ubiquitous roaming on CMRS systems is important to the development of a seamless, nationwide 'network of networks.'").

competition in the CMRS marketplace."[11] In support of its prognosis the Commission pointed to, among other things, continued increases in both market penetration[12] and average minutes of use per subscriber each month ("MOUs"),[13] along with "intense" downward pressure on price—including roaming rates.[14]

Leap does not take issue here with the Commission's finding regarding the competitiveness of the retail market for constant nationwide coverage. Were the Commission to evaluate the same data through a different lens, however—by assessing whether and to what extent consumers have the option to subscribe to local service complemented by automatic roaming—symptoms of an unhealthy market appear. As the ERS Group explains in its report, "the Commission's recent finding that … 'U.S. consumers continue to benefit from robust competition in the CMRS marketplace' does not imply that competition in the wholesale market is equally robust."[15]

Consider, for instance, the data on market penetration. According to the figures the Commission cited in its *Tenth Annual Report*, there were approximately 182 million subscribers to mobile wireless services in the United States at the end of 2004.[16] Note that nearly 148 million of those subscribers (or 81.3 percent of all subscribers) received mobile wireless services from one of five nationwide carriers: Sprint PCS, Verizon Wireless, T-Mobile, Cingular

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[11] *Tenth Annual Report*, ¶ 204.

[12] *See id.*, ¶¶ 160–64.

[13] *See id.*, ¶¶ 168–69.

[14] *See id.*, ¶¶ 128, 154–58.

[15] *ERS Report* at 4.

[16] *Tenth Annual Report*, Appendix A, Table 1, at 80.

Wireless, and Nextel.[17] Compare that with the year-end figures for 2003: six nationwide carriers[18] provided mobile wireless service to 125.4 million of the total 158.7 million subscribers (or 79 percent of all subscribers). The *ERS Report* shows that the traditional measures of concentration—the CR_4, CR_8, and the Herfindahl-Hirschman Index (HHI)—all confirm that the "nationwide carriers' relative share of the CMRS market, as compared to regional carriers, is steadily increasing."[19]

These numbers are significant because they show that, in addition to increased concentration *among* nationwide carriers, the proportional market share of the nationwide carriers *vis-à-vis* small and rural carriers, already quite substantial in December 2003, grew over the previous year. In fact, while the overall CMRS market increased by approximately 23.4 million subscribers in 2004, the rolls of nationwide carriers increased by nearly the same amount (22.5 million, or 96.3% of total industry growth). And, after the merger between Sprint and Nextel, *three nationwide carriers each have more subscribers than all the regional, small and rural carriers put together*.[20]

In short, an evaluation of the retail market for constant nationwide service does not provide a comprehensive understanding of the competitiveness of the entire CMRS market, and in particular the competitiveness of the wholesale market for roaming. As the Commission

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[17] *Id*., Appendix A, Table 4, at 86. After the Sprint and Nextel merger, announced in December 2004, only four nationwide carriers remain. *See id*., ¶ 60.

[18] AT&T Wireless had been on the list of nationwide carriers until Cingular Wireless acquired it in October 2004. *See id*., ¶ 58.

[19] *ERS Report* at 5.

[20] According to the data the Commission cited in its *Tenth Annual Report*, small, regional, and rural carriers have an estimated subscriber base of 34.1 million. See id., Appendix A, Tables 1 and 4. The *ERS Report* contains detailed analysis showing the overwhelming market power nationwide carriers possess in relation to small, regional, and rural carriers. *See ERS Report* at 4–9.

observed in its *Tenth Annual Report*, the "basic economic principle for defining the scope of the relevant geographic market is to include customers facing the choice of similar competitive alternatives in the same geographic market."[21] In evaluating wholesale markets for roaming, the Commission cannot assess the competitiveness of roaming services in each market simply by determining the number of providers offering any mobile wireless service in that area. Instead, it must consider whether customers who prefer local service complemented by broadly available roaming over constant nationwide coverage are able to obtain such service in their calling areas.

In order to get a full understanding of roaming market conditions, therefore, the Commission should determine whether there exists enough competition among providers to satisfy the demands of consumers who seek occasional roaming in each geographic area. That determination is the key to the question underlying this proceeding, namely, whether and under what circumstances the Commission should require carriers to provide automatic roaming. On that score, it is significant that the four existing nationwide carriers have an enormous share of the entire CMRS market. And regional, small, and rural carriers cannot offer roaming service to its customers unless they can negotiate reasonable wholesale roaming deals with the nationwide carriers.

Of course, the fact that a few nationwide carriers dominate the market does not by itself determine whether, as the Commission previously framed the question, "market forces alone are … sufficient to ensure the widespread availability of competitive roaming services" or, conversely, whether some carriers have the incentive "to discriminate unreasonably in the

[21] *Tenth Annual Report*, ¶ 37.

provision of roaming, or otherwise to engage in unjust or unreasonable practices."[22] In order to understand how market forces are likely to play out in the provision of automatic roaming, one must also consider the technological formats carriers use to provide mobile wireless service, and the number of providers using each format in the markets where consumers are likely to roam.

B. In Most Areas There Is a Duopoly within CMRS Digital Formats

In the United States, nearly all carriers use one of the following digital formats, collectively referred to as second-generation (or "2G") technologies, to provide voice services: CDMA, Time Division Multiple Access ("TDMA")/GSM,[23] and integrated Digital Enhanced Network ("iDEN"). Of the nationwide carriers, Sprint PCS and Verizon Wireless use CDMA, Cingular Wireless and T-Mobile use TDMA/GSM, and Nextel (now merged with Sprint PCS) uses iDEN.[24] The vast majority of handsets currently in use in the United States support only one digital format, so a mobile wireless customer can only roam on other networks with the same format as the network to which he or she has subscribed.

Most geographic markets have at best a duopoly and at worst a monopoly within at least one of those technological formats. Of the 50 largest Basic Trading Areas ("BTAs"), covering 180 million people (or over 60% of the population), all but one have duopolies in the provision of mobile wireless service in either the CDMA or the GSM format, and almost all have a monopoly for the wholesale iDEN format.[25] Attachment C to this filing is a map showing the

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[22] Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Notice of Proposed Rulemaking*, 15 FCC Rcd. 21,628, ¶ 16 (Nov. 21, 2000).

[23] For purposes of evaluating market conditions, the Commission does not distinguish between TDMA and GSM networks because the larger carriers are phasing out TDMA for GSM or a third-generation (3G) mobile wireless technology. *See Tenth Annual Report*, ¶ 110.

[24] *See id.*, ¶ 113.

[25] ERS Report at 9 & Table 4.

number of licensed facilities-based CDMA carriers (besides Leap) per county. It confirms that, even if the carriers were to build out their networks to the fullest extent permitted under existing licenses, there would still be vast areas of the country where Leap would have only one or two CDMA carriers from which to obtain roaming service.

Given the extensive footprint of each of the nationwide carriers and the relatively limited number of carriers in each area offering service using a particular format, in many areas a regional, small, or rural carrier must attempt to negotiate with only one or two nationwide carriers wielding considerable market power in order to obtain automatic roaming service for its customers. And considering that nationwide carriers have amassed an enormous share of unused spectrum, there is little room for other carriers to enter the market. As the next section explains, such market conditions do not bode well for the regional carriers—or for consumers.

C. In Combination, These Two Market Features Supply Nationwide Carriers with Ample Incentive to Refuse Competitive Automatic Roaming Agreements with Regional, Small, and Rural Carriers

In this section Leap explains (i) why the market conditions just discussed give nationwide carriers considerable leverage in negotiating agreements for automatic roaming and (ii) why the nationwide carriers are likely to use that leverage to exclude small and rural carriers from competing effectively in the CMRS market.

In general, regional, small and rural carriers find themselves in a tough negotiating position: In order to satisfy the demands of customers who want only periodic mobile wireless service outside a local calling area, a carrier frequently must hope to strike a fair bargain with one of only two potential roaming partners, each of which possess a lion's share of the overall market. It should hardly come as a surprise to learn that economic theory confirms that, in such circumstances, market forces alone are not enough to provide a competitive outcome to those negotiations.

The attached *ERS Report* evaluates the conditions present in the markets for wholesale roaming within each digital format for mobile wireless service and models those conditions using prevailing economic theory. It observes that, under the current wholesale market conditions, "large carriers' pricing decisions are in no way connected with their costs, as would be expected in a competitive environment; rather, rates are most likely being driven by the incentive to foreclose regional carriers from entering the market."[26] The report also concludes that "wholesale rates that exceed retail rates can only be a product of misused market power."[27]

The model presented in the *ERS Report*, which evaluates the market for wholesale roaming within particular formats using a modified duopoly model, confirms the market experience that nationwide carriers indeed have "strong incentives … to set roaming charges so high as to foreclose competition from regional carriers."[28] The report closes by endorsing the proposals that Leap has adopted in these comments.[29] Specifically, the report recommends that facilities-based carriers be required to offer roaming service upon request at reasonable nondiscriminatory rates, and that, where few facilities-based carriers provide service within a particular format, there should be a ceiling beyond which prices are deemed *per se* anticompetitive.[30]

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[26] *ERS Report* at 2–3.

[27] *Id*. at 23.

[28] *Id*. at 19.

[29] *See infra* at 16–20.

[30] *Id*. at 24.

III. LEAP'S EXPERIENCE CONFIRMS THAT WHOLESALE MARKETS FOR AUTOMATIC ROAMING ARE NOT FULLY COMPETITIVE

The foreclosure incentives described above are not simply a matter for theoretical speculation—Leap's on-the-ground experience reinforces that, when left to their own devices, large carriers have consistently refused to provide automatic roaming at just and reasonable rates. Leap has encountered or is aware of two anticompetitive practices that demonstrate the urgent need for the Commission to adopt the rules Leap proposes in this proceeding.

A. Carriers Have Demanded Blatantly Discriminatory and Clearly Unreasonable Rates for Automatic Roaming

In negotiations seeking automatic roaming agreements with large carriers, Leap's reasonable requests for service have often been met by unreasonable demands. Large carriers have demanded rates for automatic roaming that are on average nearly *four times* higher than the average revenue per minute the carrier received for comparable service, and nearly *seven times* what one carrier charges some of its affiliated carriers for the same service.[31] Leap has had to accede to these outrageous demands in order to assure its customers that they would have adequate roaming coverage, and there were no other facilities-based carriers from which Leap could have sought a more reasonable bargain.

The rates some carriers demand for automatic roaming often cross any conceivable demarcation of "just and reasonable." For example, one carrier has forced Leap to accept an arrangement in which Leap pays *increasing* rates for roaming the more that its customers use the network—thus penalizing Leap for *increased* volume.[32] In contrast, the large carriers generally

[31] *ERS Report* at 10.

[32] Irving Declaration, ¶ 6.

offer their own subscribers lower effective rates for increased usage.[33] This bizarre "reverse volume discount" has no reasonable relation to the carrier's costs to provide roaming service; the only possible explanation is that the carrier was flexing its market power to penalize a regional carrier for being a successful competitor.

A comparison of the rates Leap must pay for automatic roaming coverage to the average rates Mobile Virtual Network Operators ("MVNOs") pay for comparable service also highlights the discriminatory practices of large carriers. The per-minute rate that MVNOs pay large carriers is estimated to be between $0.04 and $0.08.[34] By contrast, large carriers charge Leap an average of $0.28 per minute, with the highest rates in excess of $0.40 per minute.[35] Although the MVNOs obtain volume discounts, this can hardly account for the entire price difference, given that the cost to provide the service is the same for the large carrier in either case.

It thus is reasonable to conclude that market power is the real driving force behind the rates the large carriers charge unaffiliated carriers. That conclusion is confirmed by the fact that small and rural carriers charge far less on average than the largest carriers. For instance, small and rural carriers charge Leap an average of $0.07 per minute for automatic roaming service—approximately 25% of the average rate the largest carriers demand for the same service.[36]

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[33] *See ERS Report* at 13, Table 5.

[34] *See*, *e.g.*, Marina Amoroso, *Outsourcing Prepaid to Resellers Presents a Compelling Business Case for Operators*, Yankee Group DecisionNote Trend Analysis, at 3 (July 20, 2005), available for purchase at http://www.yankeegroup.com/ (estimating postpaid rate to be from $0.04 to $0.08 per minute).

[35] Irving Declaration, ¶ 5.

[36] *Id*.

B. Carriers Should Not Be Permitted to Invoke "In-Market" Justifications to Refuse Automatic Roaming Agreements, Especially in Areas Where Regional Carriers Have No Facilities

Besides price, large carriers can and do exert their market power using other means to prevent carriers like Leap from becoming a competitive participant in the retail CMRS market. In a previous Commission rulemaking proceeding considering whether to adopt an automatic roaming rule, Cingular Wireless and Verizon filed comments urging the Commission to declare that carriers could lawfully deny "in-market" roaming requests.[37] Sprint PCS opposed their proposal, noting that a "roaming 'carveout' [would] be difficult to achieve and enforce" and would also "create great customer uncertainty, disrupt service and lead to the loss of ubiquitous coverage expected by consumers."[38] Sprint further observed:

> Cingular Wireless and Verizon are both willing to forego their highly profitable in-market revenue stream because they think they can increase their competitive position further by handicapping their competitors. Again, these two carriers want to compete based on the inherent advantage they possess as a direct result of their sizable head start and more mature networks.[39]

Leap shares the concerns Sprint expressed in that proceeding and believes they are still relevant—if not more so—in today's marketplace. Large carrier refusals to provide any roaming service to customers of facilities-based regional competitors in large geographical areas (which may constitute all or most of a state, for example) under the guise of an "in-market" roaming exclusion can have extremely pernicious effects, depending upon the implementation of the exclusion. If a regional carrier, for example, were to provide facilities-based service in only portions of a large service area designated as excluded from roaming coverage by a larger carrier

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[37] *Comments of Verizon Wireless*, WT Docket No. 00-193, at 11 (Jan. 5, 2001); *Comments of Cingular Wireless*, WT Docket No. 00-193, at 9 (Jan. 5, 2001).

[38] *Ex Parte Presentation of Sprint PCS*, WT Docket No. 00-193, at 6 (Mar. 8, 2002).

[39] *Id*.

under an "in-market" exception, the regional carrier's customers would be stranded in any attempt to roam off of the regional carrier's system if there is no roaming agreement in place with another provider. The net result in such a scenario would be no roaming coverage for the customers *at all* throughout large portions of the states in which they live.[40]

C. Leap's Customers Are Harmed by Such Anticompetitive Roaming Practices

The anticompetitive practices of large carriers have caused and can cause considerable harm to Leap's customers. Leap customers have had to pay higher roaming prices because of the discriminatory practices of these carriers. And because traditional post-paid options are often unavailable to many customers within Leap's demographic because of poor credit ratings, Leap believes that such customers would be forced to switch to MVNO and prepaid wireless services offerings to the extent that they need roaming coverage during the occasional times they travel outside of their home areas, and Leap cannot provide it. In either case, Leap customers are required to bear higher overall prices for service – and many of these customers have limited discretionary incomes. The Commission should be especially sensitive to the harm the failures of the market have or would inflict upon this important and historically under-served base of consumers.

IV. THE COMMISSION SHOULD INTERVENE TO PROMOTE COMPETITION IN THE CMRS MARKET

The Congress has clearly assigned CMRS carriers the obligation to provide roaming upon reasonable request, at just and reasonable and nondiscriminatory rates. Leap urges the Commission to take this opportunity to adopt the following rules in order to facilitate enforcement of those obligations, to promote competition, and to protect the public interest:

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[40] Irving Declaration, ¶ 7.

1) The Commission should require facilities-based carriers to furnish automatic roaming service upon the request of another carrier, including a facilities-based competitor, unless the facilities-based carrier adequately demonstrates to the Commission that the service is not compatible with, or there is no available capacity on, its network.

2) Facilities-based carriers should be prohibited from discriminating against similarly-situated carriers in the rates charged for, or the terms and conditions of, roaming service.

3) In areas where there are three or fewer facilities-based carriers from which the carrier seeking automatic roaming service could obtain such service, the Commission should prohibit a facilities-based carrier from demanding rates for automatic roaming that exceed that carrier's average retail revenue per minute for that area**.**

A. The Commission Should Require Carriers to Furnish Automatic Roaming To Any Person Requesting Such Service at Non-Discriminatory Rates

Section 201(a) of the Communications Act, 47 U.S.C. § 201(a), states it "shall be the duty of every common carrier engaged in interstate … communication by wire or radio to furnish such communication service upon reasonable request therefor." Similarly, Section 332(c)(1)(B) of the Act provides:

> Upon reasonable request of any person providing commercial mobile service, the Commission shall order a common carrier to establish physical connections with such service pursuant to the provisions of section 201 of this title.

It is beyond dispute that CMRS carriers are "common carriers"[41] and that roaming is a common carrier service subject to the requirements these provisions impose.[42]

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[41] *See* 47 U.S.C. § 332(c)(1)(A) ("A person engaged in the provision of a service that is a commercial mobile service shall, insofar as such person is so engaged, be treated as a common carrier for purposes of this chapter ….").

[42] *See* Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Notice of Proposed Rulemaking*, 15 FCC Rcd. 21,628, ¶ 16 (Nov. 21, 2000) ("We further affirm our determination that roaming is a common carrier service because roaming capability gives end users access to a foreign network in order to communicate messages of their own choosing, and thus that the provision of roaming is subject to the requirements of Sections 201(b), 202(a), and 332(c)(1)(B) of the Communications Act.").

It follows that an outright refusal to furnish automatic roaming upon request is prohibited, and the Commission should so declare in this proceeding. This practice is particularly harmful to competition and, hence, to consumers, because in most areas there are only a few potential roaming partners and they typically have considerable market power. Consumers should be given greater flexibility to subscribe to local area coverage augmented by roaming if they so choose, and an outright refusal to provide automatic roaming serves only to hinder the efforts of carriers to offer such services.

To be sure, a facilities-based competitor should be permitted to refuse automatic roaming service if it demonstrates that the service is technologically incompatible with its network or if it has no available capacity on its network. Beyond these concerns regarding the feasibility of providing roaming service, however, a carrier should not be able to refuse a carrier's reasonable request for automatic roaming services. A rule requiring carriers to provide this service upon reasonable request enhances consumer welfare and is in the public interest.

For similar reasons, carriers should not be permitted to invoke an "in-market" exception to their clear statutory obligation to provide roaming to "any person" requesting such service. As Sprint PCS observed,[43] such an exception would be difficult and costly to administer, whereas a "bright-line" rule enabling all carriers to roam is much easier to enforce and is consistent with the Commission's goal of developing "nationwide, ubiquitous, and competitive wireless voice telecommunications."[44]

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[43] *See* n.38, *supra*.

[44] Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, CC Docket No. 94-54, *Second Report and Order and Third Notice of Proposed Rulemaking*, 11 FCC Rcd. 9462, 9464 ¶ 2 (Aug. 15, 1996) (addressing importance of roaming on broadband wireless networks); *see also* Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Notice of Proposed Rulemaking*, 15 FCC Rcd.

The Commission should also expressly adopt a rule requiring carriers to charge the same rates for similarly-situated carriers. This rule is grounded in 47 U.S.C. § 202, which states:

> It shall be unlawful for any common carrier to make any unjust or unreasonable discrimination in charges, practices, classifications, regulations, facilities, or services in connection with like communication service, directly or indirectly, by any means or device, or to make or give any undue or unreasonable preference or advantage to any particular person, class of persons, or locality, or to subject any particular person, class of persons, or locality to any undue or unreasonable prejudice or disadvantage.

The *ERS Report* contains detailed analysis demonstrating that price discrimination under the circumstances present in the wholesale market for roaming lacks any plausible economic justification and serves only to harm consumer welfare.[45] An express rule emphasizing that carriers may not discriminate in their pricing practices would promote efficient bargaining and would save time and expense in resolving issues before the Commission in complaint proceedings.

B. The Commission Should Adopt a Bright-Line Rule Setting a Price Cap for Roaming

In light of the technological constraints that limit the number of potential roaming providers with which a regional, small, or rural carrier has to bargain, and because nationwide carriers have considerable market power compared with small, regional, and rural carriers, the Commission should set some benchmark measures to help contain the excessive prices large carriers currently charge for automatic roaming service. One benchmark to consider is the average revenue per minute a facilities-based carrier obtains for service in the particular area, which is calculated by dividing the carrier's estimated average revenue per unit ("ARPU") by the

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21,628 ¶ 15 (Nov. 21, 2000) ("We affirm our conclusion … that ubiquitous roaming on CMRS systems is important to the development of a seamless, nationwide 'network of networks.'").

[45] *See ERS Report* at 14–17.

estimated minutes of use per customer.[46] As the Commission observed in its *Tenth Annual Report*, "some analysts believe average revenue per minute ("RPM") is a good proxy for mobile pricing."[47]

As the *ERS Report* observes, a pricing cap based on retail pricing has several advantages over other methods of intervention. First, it leaves a considerable profit margin for carriers, especially because retail pricing takes into account customer acquisition, customer care, and billing costs that a carrier would not incur with respect to wholesale roaming. Second, it would be easy for the Commission to administer and does not require extensive oversight by the Commission. Third, a ceiling based on retail pricing could be determined based on publicly-available data and so it would be unnecessary to review confidential or proprietary information.[48]

In circumstances where market forces are sufficient to ensure that carriers will provide roaming service at a competitive price, a benchmark would be unnecessary. Therefore, in areas where the carrier seeking automatic roaming has more than three potential roaming partners, the Commission could forbear from applying its benchmark measures to determine whether the rates for automatic roaming are just and reasonable, and rely solely on the ordinary complaint procedure provided in Section 208.[49]

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[46] Leap proposes a price ceiling with respect to voice service; it does not believe a price ceiling is necessary at this time for data services.

[47] *Tenth Annual Report*, ¶ 204.

[48] *See ERS Report* at 19.

[49] *Cf. PCIA Forbearance Order*, 13 FCC Rcd. 16,857, 16896 (1998) (statement of Commissioner Furchtgott-Roth, suggesting forbearance of Commission rules may be appropriate in areas where consumers have a choice among at least four facilities-based CMRS providers).

C. These Rules Would Promote Ubiquitous Coverage and Would Not Impact Incentives to Continue Expanding Facilities-Based Services

The rules Leap proposes would lead to considerable benefits and would not impose unreasonable burdens upon either the Commission or nationwide carriers. For one thing, bright-line rules streamline enforcement proceedings and make bargaining between carriers easier because both carriers understand the boundaries of the negotiation.[50] Further, the Commission has considerable experience evaluating claims for discrimination in other contexts, and so enforcement of nondiscriminatory rules in this market would not be hard for the Commission to administer. And the rules would not impact carriers' incentives to expand facilities-based services, because under the rule carriers would still obtain substantial revenues from roaming and would bear minimal, if any, additional costs in providing roaming service.

V. CONCLUSION

Commissioner Copps has noted U.S. consumers' increasing reliance on wireless telephony to "stay connected with family, friends and colleagues" and the attendant importance of roaming services in that regard.[51] And Commission Adelstein has observed that "consolidation in the wireless industry over the past 12 months has only served to amplify existing concerns about the current state of roaming practices."[52]

Leap agrees. Based upon recent competitive developments in the wireless industry, the predictions of economic theory, and the real-world reported experiences of smaller and regional carriers like Leap, the record in this proceeding will demonstrate not only the basis but an urgent need for prompt, targeted Commission intervention with respect to automatic roaming services.

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[50] *See, e.g.*, Jonathan R. Hay, Andrei Schleifer, and Robert W. Vishny, *Toward a Theory of Legal Reform*, 40 EUROPEAN ECON REVIEW 559 (1996) (outlining benefits of bright-line rules).

[51] WT Docket No. 05-265, *Statement of Commissioner Michael J. Copps*.

[52] WT Docket No. 05-265, *Separate Statement of Commissioner Jonathan S. Adelstein*.

Leap respectfully asks the Commission to adopt the rules that it has proposed, which will present minimal practical burdens upon the nation's largest wireless carriers, and will impose limited administrative burdens on the Commission. On the other hand, the rules will provide enormous benefits for consumers generally, and in particular, will promote the interests of historically under-served consumers to whom regional carriers such as Leap have been striving to provide expanded service and better value.

Respectfully submitted,

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Reexamination of Roaming Obligations of	)	WT Docket No. 05-265
Commercial Mobile Radio Service Providers	)	

COMMENTS OF LEAP WIRELESS INTERNATIONAL, INC.

Attachment A

WHOLESALE PRICING METHODS OF NATIONWIDE CARRIERS PROVIDING COMMERCIAL MOBILE RADIO SERVICE: AN ECONOMIC ANALYSIS

ERS Group

November 28, 2005

Introduction

Over the last five years, nationwide carriers have grown increasingly dominant in the Commercial Mobile Radio Services ("CMRS") market and have used their power to make it ever more difficult for regional carriers[1]—even innovative ones—to offer competitive roaming service. Available data show that in some areas the nation's largest carriers charge unaffiliated regional carriers wholesale rates that well-exceed the average retail rate for comparable services. This practice is anti-competitive and inflicts substantial harm on consumers in the form of inflated charges for nationwide mobile wireless coverage and reduced access to roaming.

Economic theory teaches that, absent intervention, nationwide carriers are likely to continue obstructing competition and, consequently, to continue harming consumers. This paper describes how current market conditions have given nationwide carriers the incentive to adopt anticompetitive practices and explains why these practices are likely to harm consumers. It recommends that the Federal Communications Commission ("the Commission") intervene in a narrow and targeted fashion in order to counteract this incentive, thereby promoting full competition and protecting consumer welfare without hindering further development of the CMRS industry.

This paper opens with a discussion of relevant characteristics of the current CMRS market and reviews the available data on the prices large carriers charge for mobile wireless service at both wholesale and retail levels. Section 2 applies to this setting the prevailing economic literature and knowledge and shows that nationwide carriers' pricing decisions are in no way connected with their costs, as would be expected in a competitive environment; rather,

[1] This paper uses the shorthand, "regional carriers," to refer to all carriers that do not have a nationwide footprint.

rates are most likely being driven by the incentive to foreclose regional carriers from entering the market. It goes on to analyze the harmful impact these supra-competitive rates impose on consumer welfare.

Then, in Section 3, this paper presents an economic model of the CMRS market for wholesale services; the model (explained in detail in the Appendix) confirms that anti-competitive pricing practices are indeed likely to arise in geographic areas where the provision of wholesale roaming is not fully competitive, namely, where regional carriers have no more than two facilities-based carriers with which to negotiate, due to the incompatibility between the technological standards used by different carriers. Finally, this paper closes by urging the Commission to require, at least where potential roaming providers are few, that all facilities-based carriers offer wholesale mobile wireless service at non-discriminatory rates not to exceed the average per-minute revenue that the carriers obtain for service in that area. This benchmark provides a reasonable, easily enforceable, and nonintrusive method to determine when nationwide carriers act anti-competitively, that is, when the roaming prices they set lack any plausible competitive justification.

I. CMRS Wholesale Market Conditions and Pricing Practices

This section briefly describes the features of the current CMRS wholesale marketplace that are key to understanding what motivates nationwide carriers to set roaming prices at existing rates, and then it summarizes the available data as to what those existing rates actually are. It is important to stress at the outset that this paper is focused on regional wholesale markets, as distinct from retail markets. This paper provides data showing that, in many regions, there are only one or two suppliers of wholesale roaming for one or more CMRS technologies. As technology does not permit resale of retail minutes on the wholesale market, the wholesale and

retail markets are separate and will have different levels of competition and different prices. This also means that the Commission's recent finding that, despite fewer nationwide, facilities-based carriers providing retail mobile wireless service, "U.S. consumers continue to benefit from robust competition in the CMRS marketplace"[2] does not imply that competition in the wholesale market is equally robust. Even though retail market conditions may be sufficient to compel carriers to compete with respect to mobile wireless service in general, the same does not hold true in the particular context of the wholesale market for roaming in a large number of areas.

The concern of this paper is with those regional markets—cellular market areas ("CMAs"), Basic Trading Areas ("BTAs"), or counties—in which there are a few carriers providing wholesale roaming service using a particular digital format. Incompatibility of air interfaces across technologies limits the number of available facilities-based carriers from which service agreements can be obtained. As we show below, the net effect is that in most regional markets, nationwide carriers have an effective duopoly in the provision of wholesale service for at least one of the two main CMRS technologies, CDMA and GSM.[3]

A. The Duopoly in the Market for Wholesale Roaming

There are four facilities-based carriers in today's retail CMRS market—Sprint PCS/Nextel, Verizon Wireless, T-Mobile, and Cingular Wireless—that are commonly referred to as "nationwide" carriers because their "footprint," or facilities-based coverage area, extends to a

[2] Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, WT Docket No. 05-71, *Tenth Report*, FCC 05-173, ¶ 204 (rel. Sept. 30, 2005) ("*Tenth Annual Report*").

[3] There is also typically only one supplier of iDEN roaming service in almost all BTAs and CMAs. In addition, there is currently only one carrier providing WCDMA in most areas. We are not addressing roaming of older, and fading, analog, AMPS, and TDMA technologies.

significant portion of all three major regions of the Untied States (western, midwestern, and eastern).[4] The number of nationwide carriers is down from five a year ago, and from six in 2003.

As of December 2004, the four nationwide carriers provided mobile wireless service to nearly 148 million of the 182 million subscribers in the United States, 81.4 percent of the total subscriber base, up from 79 percent in 2003.[5] Including affiliates, the CR_4, which measures the concentration ratio of the subscribers of the top four carriers, was roughly 84 percent—a striking increase from 64 percent in 2003. In fact, the three biggest carriers (Cingular Wireless, Verizon Wireless, and Sprint PCS/Nextel) provide mobile wireless service to more subscribers than all of the regional carriers combined. Table 1 lists the CR_4, along with the CR_8 (the same concentration ratio for the top eight providers) and the Herfindahl-Hirschman Index (HHI), for the years 1999 through 2004. Each measure plainly demonstrates that nationwide carriers' relative share of the CMRS market, as compared to regional carriers, is steadily increasing:

[4] *Tenth Annual Report*, ¶ 25. With the completion of the August 12, 2005 merger between Sprint PCS and Nextel, the number of nationwide carriers is now down to four from five.

[5] *Id*. at 86, Appendix A, Table 4. These figures are reached by combining the data provided for Sprint PCS and Nextel.

TABLE 1
CMRS CONCENTRATION 1999–2004[6]

Year	HHI	CR_4	CR_8
1999	786	43.66	70.66
2000	1351	66.84	85.24
2001	1326	67.16	87.66
2002	1340	66.69	90.21
2003	1308	64.49	89.48
2004	1982	83.88	93.84

On a related point, the data show that, in many areas, consumers can obtain mobile wireless service only from nationwide carriers—that is, regional carriers do not provide facilities-based service in many markets. To be sure, as the Commission noted in its 2004 Annual Report, "97 percent of the total U.S. population lives in counties with access to three or more different operators offering mobile telephone service" and 87 percent live in counties with five or more operators; but considering there were five nationwide carriers in 2004, those numbers merely reflect the nearly ubiquitous market penetration of the nationwide carriers.[7] Reinforcing this point is the fact that only 41.3 percent of the population had the choice of six or more carriers in 2004, compared with 76 percent in 2003. Table 2 shows the change in market entry over time.

[6] The HHI's, CR_4, and CR_8 calculations are based on the subscriber numbers found in the Federal Communications Commission's *Seventh*, *Eighth*, *Ninth*, and *Tenth Annual CMRS Competition Report*s. Further evidence of concentration can be ascertained by evaluating the spectrum holdings of the various carriers and the number of licensees in each area.

[7] *Tenth Annual Report*, ¶ 2; 89, Appendix A, Table 9. Note that these measures were taken when there were five nationwide providers; as has already been noted, there are now only four.

TABLE 2
MARKET ENTRY OVER TIME[8]

	Percent of Total US POPs Covered					
Total Number of Providers in a County	**Tenth Report**	**Ninth Report**	**Eighth Report**	**Seventh Report**	**Sixth Report**	**Fifth Report**
3 or more	96.9%	96.8%	94.7%	94.1%	90.8%	87.8%
4 or more	93.2%	93.0%	89.3%	88.7%	84.4%	79.8%
5 or more	87.3%	87.5%	82.6%	80.4%	75.1%	68.5%
6 or more	41.3%	75.8%	71.1%	53.1%	46.7%	34.6%
7 or more	12.6%	29.5%	25.4%	21.2%	11.9%	4.4%

In sum, over the last five years the CMRS market has seen increased consolidation leading to fewer nationwide carriers and increased concentration in the market share of those nationwide carriers. Although a majority of the population has the choice of five facilities-based carriers, a much smaller portion has access to six or more carriers, and in many areas consumers have only the four nationwide providers from which to choose. The significance of these facts will become clear upon examination of the technological features of mobile wireless service.

There are three primary digital wireless technologies used in the United States to provide mobile wireless service: Code Division Multiple Access (CDMA), Global System for Mobile Communications (GSM), and integrated Digital Enhanced Network (iDEN).[9] Two nationwide carriers use the CDMA standard (Sprint PCS/Nextel[10] and Verizon Wireless) and two use GSM

[8] *Id*. at 89, Appendix A, Table 9.

[9] A fourth technology, Time Division Multiple Access (TDMA), had been more common but is currently being phased out and replaced by GSM. The Commission no longer distinguishes TDMA from GSM technology. *See Tenth Annual Report*, ¶ 110. Cingular is now introducing another new technology, WCDMA.

[10] Sprint PCS/Nextel and its partially owned affiliate, Nextel Partners, also has a nationwide iDEN network.

(Cingular and T-Mobile). The different technologies play a crucial role in understanding the workings of the wholesale roaming market because most handsets are compatible with only one technology. Hence, a roaming customer may only access networks with the same digital format as the network to which he or she subscribed.[11] For this reason, there are three separate wholesale markets for digital roaming services in each region: a CDMA market, a GSM market, and an iDEN market.[12]

As just explained, one impact that consolidation has had on the market for roaming is that, on average, there are slightly more than five carriers providing service in each area. As Table 3 reflects, the market penetration for each technology is nearly ubiquitous.

TABLE 3
MOBILE TELEPHONE DIGITAL COVERAGE[13]

Technology	POPs in Those Areas	% of Total POPs	Square Miles Covered	% of Total Square Miles
CDMA	279,966,795	98.1%	3,017,538	83.7%
TDMA / GSM	277,837,880	97.4%	2,445,612	67.8%
iDEN	262,564,508	92.0%	1,707,650	47.3%
Total Digital	284,904,797	99.8%	3,211,352	89.0%

Even if there are five providers in any given area, a regional carrier does not have a choice of five potential suppliers of roaming services. Indeed, as Table 4 shows, in most regions, there is at least one duopoly, either for CDMA roaming services or for GSM roaming services.

[11] Although a few dual mode GSM/CDMA compatible handsets, designed for the European GSM bands, are available, these handsets are expensive and it is not a practical alternative for an operator using one technology to enter into a roaming agreement with an operator using the other main technology.

[12] There are also wholesale markets for the older analog AMPS technology.

[13] *Tenth Annual Report* at 88, Appendix A, Table 6.

In fact a regional operator will typically have only one or two potential roaming partners with which to negotiate—usually Cingular or T-Mobile if it is a GSM carrier and Sprint or Verizon if it is a CDMA carrier. Table 4 shows the number of facilities-based operators for the CDMA and GSM formats in the 50 largest BTAs, and demonstrates that a CDMA operator will have three or more suppliers of wholesale roaming services in 27 BTAs; a GSM operator will have three or more suppliers of wholesale roaming services in only 3 BTAs. In only ***two*** of the 50 largest BTAs are there three or more facilities-based carriers in both formats.[14]

TABLE 4
WHOLESALE ROAMING MARKET STRUCTURE IN THE FIFTY LARGEST BTAS

Numbers of (CDMA,GSM) Carriers	(2,2)	(2,3+)	(3,2+)	(3+,3+)
# of Markets	22	1	25	2

B. Pricing Practices

At both wholesale and retail levels, CMRS carriers use a wide array of pricing methods to provide mobile wireless service. Although the circumstances and the terms vary, and public information about wholesale rates is limited, there are some troubling facts that can be gleaned from the available data. As a general matter, large carriers charge unaffiliated carriers far higher

[14] Table 4 is based on the operators providing service in the largest counties in each BTA. In some cases, one operator may serve some counties in a BTA and in others, another operator may do so. Table 4 is based on the counties with the largest population within each BTA. The data in Table 4 is based on the spectrum holdings recorded at the FCC Universal Licensing System http://wireless.fcc.gov/uls/ and on the information about availability of service posted at various operator web-sites. This list only represents a snapshot of what is available in November of 2005. For instance, some licenses won in Auction 58 have not yet been built out. We did not record those licensees as offering service in those areas. One example is Verizon; it is not counted as offering service in Oklahoma City.

wholesale rates than they charge Mobile Virtual Network Operators ("MVNOs") and affiliated carriers. Moreover, small and rural facilities-based carriers' rates for wholesale service are typically less than large carriers' rates, even though small and rural carriers have no cost advantages in providing wholesale services.[15]

The most remarkable fact that emerges from the data, however, is that *large carriers often charge unaffiliated regional carriers more for mobile wireless service than they charge their retail customers for comparable service*; in fact, in some reported cases the average of the wholesale rates is nearly four times the average of the retail rates. What makes this difference even more striking is that carriers incur greater costs in serving retail customers than they do in serving wholesale customers.

Wholesale rates, as this paper uses the term, are fees—typically assessed on a per-minute basis—that a facilities-based carrier charges another carrier that has limited or no facilities-based coverage in that area to use its network. Purchasing carriers can be grouped into three categories: MVNOs, affiliated carriers, and unaffiliated carriers. Although it costs facilities-based carriers roughly the same to provide mobile wireless service to purchasing carriers of all categories,[16] the rates unaffiliated carriers obtain from large carriers are radically higher than those obtained by both MVNOs and affiliated carriers. The best estimates from available data

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[15] Declaration of Robert J. Irving, Jr. ("Irving Declaration"), ¶ 5. Indeed, regional carriers can have a cost disadvantage in that the scale economies for some components of a mobile network may be sufficiently large so as to benefit the national carriers.

[16] Affiliates and/or MVNOs may purchase other services from the large carrier, such as billing and call center services, which unaffiliated regional carriers are not likely to purchase. However, the value large carriers derive from these tie-ins cannot explain the differences. Retail rates, which must exceed the costs of these tie-ins are, on the margin, no more than $.03 or $.04 per minute based on the rates quoted by each of the four national carriers, and are explained in more detail below. Large carriers can also obtain a share of their affiliate revenues. However, these shares cannot logically exceed 100% of the revenues, which would have to be the case to explain the price differentials.

are that MVNOs typically pay large carriers between $0.04 and $0.08 per minute,[17] and affiliates pay $0.05 to $0.10 per minute.[18] In contrast, at least one unaffiliated carrier—Leap Wireless—reports that it pays large carriers on average $0.28 per minute.[19] Leap Wireless also reports that with respect to one large wireless carrier, it must pay rates that *increase* with volume.[20]

The appropriate large carrier retail rate to use as a comparison against each large carrier's wholesale rate cannot be determined with precision because each carrier offers many different price and service plans. In any event, a precise figure is not necessary for present purposes, but any comparison of wholesale and retail rates should take into account the differences in operating costs for serving wholesale and retail customers. One of the biggest differences in wholesale and retail operating costs relates to customer acquisition expenses, which can exceed $350 per customer.[21] Amortizing $350 of customer acquisition costs using a 10% interest rate and a 1.5% monthly churn rate means that an operator incurs almost $8 per month for retail customer acquisition costs that the operator does not incur in connection with the sale of wholesale minutes.[22] In addition, operators must incur customer care and billing costs for retail subscribers that they do not incur in connection with the sale of wholesale minutes. In total, an

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[17] *See* Yankee Group DecisionNoteSM Trend Analysis, July 20, 2005, by Marina Amoroso, "Outsourcing Prepaid Wireless to Resellers Presents a Compelling Business Case for Operators" (hereafter "*Yankee Group Report*").

[18] *See* iPCS-Horizon Investor Presentation, March 17, 2005, available at: http://www.ipcswirelessinc.com/Investor_Relations/Documents/iPCS-Horizon%20Investor%20Presentation%20FINAL.pdf (reporting $0.058 to $0.10 roaming agreement with Sprint); *Wireless Week*, "AllTel Moves, But Stock Doesn't," (March 13, 2000) (reporting single-digit roaming rate with Bell Atlantic, now Verizon Wireless).

[19] Irving Declaration, ¶ 5.

[20] Irving Declaration, ¶ 6.

[21] Customer acquisition costs typically exceed $300 and can exceed $400. For example, in 4Q 2004, T-Mobile reported in its fourth quarter 2004 releases that its gross cost per additional customer is $345. *See* http://www.t-mobile.com/company/investors/financial_releases/2004_Q4Final.pdf. Suncom reported these costs as $453. *See* http://www.eet.com/press_releases/prnewswire/showPressRelease.jhtml?articleID=X390968&CompanyId=1). Western Wireless reported these costs as $353. *See* http://biz.yahoo.com/e/050506/wwca10-q.html. Also, the *Yankee Group Report* quotes an average cost of $378 per subscriber.

[22] At 3% monthly churn, amortized customer acquisition costs are over $12 per month.

operator can incur costs of $15 or more per retail customer per month for subscriber acquisition, billing and customer care that the operator does not incur for wholesale minutes.[23] One can calculate the retail per minute price for an average subscriber usage of 584 minutes per month[24] net of customer acquisition costs, billing costs and customer care costs for each of the four national operators.[25] Assuming these latter costs amount to $15 per month, the national carriers' revenues, net of customer care, acquisition and billing costs, range from $0.043 per minute for T-Mobile to $0.078 for Verizon Wireless and Cingular.[26]

Table 5 shows the gross and net revenues per minute for each of the nationwide carriers based on the different pricing plans they offer.

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[23] None of the large operators separately report billing and other customer care costs. T-Mobile reports General and Administrative costs ($10.76 per sub in 2004), which include these costs. *See* http://www.t-mobile.com/company/investors/financial_releases/2004_Q4Final.pdf. Cingular, Sprint, and Verizon Wireless report selling, general and administrative costs of $18.36, $17.83 and $19.02 per subscriber. *See* http://library.corporate-ir.net/library/12/125/125269/items/169790/CW_3q05_1.xls, http://www.sprint.com/investors/earnings/qe/2q05pres.pdf, and http://news.vzw.com/investor/3Q2005.xls. These costs are in addition to subscriber acquisition costs.

[24] *Tenth Annual Report* at 89, Appendix A, Table 8.

[25] Cingular rates were obtained from http://onlinestorez.cingular.com/cell-phone-service/wireless-phone-plans/cell-phoneplans.jsp;dsessionid=Q01BPSSECCR5TB4ROEUCFFA?pflow=a; Verizon Wireless rates were obtained http://www.verizonwireless.com/b2c/store/controller?item=planFirst&action=viewPlanDetail&sortOption=priceSort&catID=323&cm_re=Home%20Page-_-Personal%20Box-_-Individual%20Plans; SprintPCS rates are from http://www1.sprintpcs.com/explore/servicePlansOptionsV2/FreeClearFairFlexiblePlans.jsp?FOLDER%3C%3Efolder_id=1661521&CURRENT_USER%3C%3EATR_SCID=ECOMM&CURRENT_USER%3C%3EATR_PCode=None&CURRENT_USER%3C%3EATR_cartState=group&bmUID=1130950705079.

[26] These averages use the rate plan that provides the best value for a customer that uses 584 minutes per month. Note all the rate plans include free on-net calls and off-peak calls. The calculations overstate the average revenues by assuming that all calls are off-net and on-peak. Adding amortized customer acquisition costs would result in non-network costs of over $20 per month except for firms with the lowest customer acquisition costs and churn rates under 1.6%.

TABLE 5
POST-PAY RATES AND NET REVENUES PER MINUTE

	VZW		Cingular		Sprint		T-Mobile	
Included anytime minutes	900	6000	900	6000	1000	2000	600	5000
Monthly charge	$60	$200	$60	$200	$56	$100	$40	$130
Gross revenues per minute	$0.15	$.03	$0.15	$.03	$.056	$.05	$0.15	$.026
Monthly revenues net of costs of customer acquisition, customer care and billing	$45	$185	$45	$185	$41	$85	$25	$115
Net revenues per minute	$.050	$.031	$.050	$.031	$.041	$.043	$.042	$.023

For a large customer using over 1000 minutes per month, these average net revenues per minute range from $0.023 for T-Mobile to $0.043 for SprintPCS. The FCC calculates average gross revenue per minute for all retail minutes at $0.09.[27] By subtracting $15 per customer per month for the cost of servicing retail customers, and taking the remaining revenue per minute based upon an average of 584 minutes per subscriber per month, the average revenue per customer per month is $0.064, net of customer acquisition, billing and care costs. Whatever approach is used, however, it is clear that the average rates that nationwide carriers charge regional carriers for wholesale roaming service far exceed the average revenues those same carriers obtain from retail customers using their networks.

[27] *Tenth Annual Report* at 89, Appendix A, Table 8.

II. Existing Roaming Rates are Anticompetitive

This section explains, using prevailing economic theory, how the conditions present in the CMRS marketplace provide nationwide carriers the incentive to implement anti-competitive pricing methods for wholesale service, and demonstrates that the rates charged to regional carriers must in fact be anti-competitive. Part A discusses price discrimination. Specifically, it details the conditions under which price discrimination is likely to be pro-competitive and, conversely, when it is likely to harm consumers; it then explains why the sort of price discrimination engaged in by nationwide carriers vis-à-vis unaffiliated carriers must be anticompetitive and describes the harm that consumers have likely suffered as a result of nationwide carriers' pricing practices. Part B explains why national carriers should be required to set non-discriminatory wholesale rates for roaming services and at levels that do not exceed retail rates.

A. Price Discrimination

Price discrimination refers to the practice of charging different prices to different customers or in different markets. Price discrimination is generally categorized into three groups: discrimination based on an individual's willingness to pay is called "first-degree price discrimination"; discrimination based on the number of units sold is called "second-degree price discrimination"; and discrimination based on segmentation of the market is called "third-degree price discrimination."[28] Price discrimination of any sort is feasible only if three conditions are met:

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[28] *See, e.g.*, Lars A. Stole, "Price Discrimination and Imperfect Competition," forthcoming in the *Handbook of Industrial Economics,* also available at http://web.mit.edu/14.271/www/hio-pdic.pdf, for a survey of the literature on price discrimination.

> (1) The firm must have some market power. In a perfectly competitive market, prices are necessarily uniform. A firm with market power can offer different prices and thereby increase profits because it extracts more of the consumer surplus than would be the case if it had to charge everyone the same price.
>
> (2) The firm must also be able to separate customers into different groups having different demand elasticities.
>
> (3) The firm must be able to prevent arbitrage (e.g., by preventing customers who purchase the product at relatively low prices from reselling the product to customers who face higher prices).[29]

Section I documents that nationwide carriers set different roaming rates for affiliates and MVNOs than they do for unaffiliated regional operators. This is third-degree price discrimination. Nationwide carriers also adjust wholesale roaming rates based on the volume of minutes. This is second-degree price discrimination. This section focuses on third-degree price discrimination; when nationwide carriers offer wholesale roaming, the volume discounts are often irrelevant, because the high roaming charges are essentially prohibitive. Second-degree price discrimination, which is non-discriminatory, is not necessarily anti-competitive, unless it is designed in a way so as to mimic third-degree price discrimination.[30]

Price discrimination is not inherently anticompetitive. The economics literature shows that, if discriminatory pricing leads to an increase in total output, then consumers can benefit from the practice. This is because a firm allowed to price discriminate can sell goods or services to more customers, including market segments that the firm might otherwise not serve. These

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[29] *Id.*

[30] Second-degree price discrimination, or volume discounts, can be designed in way to discriminate between carriers based on size. In this case, second-degree discrimination becomes de facto third-degree discrimination as well.

results are robust to different assumptions about demand and costs.[31] Conversely, third-degree price discrimination will generally reduce welfare when it reduces output.

Most of the literature on price discrimination is concerned with a firm with market power selling to end-users. Michael L. Katz (1987)[32] extended the analysis of third-degree price discrimination to the case in which an upstream firm with market power is selling to downstream firms, possibly in competition with its own affiliates. In Katz's model, the upstream market corresponds to the market in which the regional coverage does not have coverage and the downstream market is the one in which the regional carrier does have coverage. A nationwide carrier corresponds to a firm that operates in both the upstream and downstream markets, selling wholesale (roaming) minutes to the regional operator—upstream—while at the same time it competes directly in the downstream market with the regional operator for subscribers.

Katz's analysis explains how the results about third-degree price discrimination need to be modified for a firm with market power in the supply of an intermediate product. Katz only identifies one potentially relevant case in which third-degree price discrimination can increase welfare relative to a uniform monopoly price. This is the case in which third-degree price discrimination deters the regional operator from inefficiently expanding coverage. However, for that result to apply to this situation, the nationwide operator would necessarily offer wholesale roaming rates that are below, and not above, prevailing retail rates. Moreover, setting roaming prices above prevailing retail rates simply cannot improve total welfare; this practice can only reduce total output, limit competition, and limit the options available for consumers.

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[31] Bertoletti, Paolo, "A Note on Third-Degree Price Discrimination and Output," *Journal of Industrial Economics* (forthcoming).

[32] Katz, M., "The Welfare Effects of Third-Degree Price Discrimination in Intermediate Good Markets," *American Economic Review* 77 (1987): 154-167.

The largest carriers' practice of charging wholesale rates that exceed retail rates has two obviously anticompetitive effects. First, it limits service offerings and rate plans that are available to consumers. Second, it restricts the ability of regional carriers to compete effectively with respect to consumer segments for which nationwide coverage is a significant factor; regional carriers are on a level playing field only with respect to customers who do not place much value on the ability to roam. In short, the largest carriers' pricing practices reduce welfare for most consumers; the Commission should intervene in order to promote competition in the marketplace. The imposition of mandatory automatic roaming at non-discriminatory rates, which is required in much of Europe, would ensure that regional carriers have access to roaming at rates comparable to what nationwide carriers charge affiliates and MVNOs. That solution would promote a more competitive market for CMRS services.

B. Wholesale Rates Should Not Exceed Retail Rates

While economic theory does not suggest that any single price will necessarily be anti-competitive, it does teach that allowing nationwide carriers to set wholesale prices above retail prices is unlikely to improve consumer welfare. Nationwide operators' use of both second-degree and third-degree price discrimination forecloses competition from regional carriers and reduces output. A price ceiling in markets in which wholesale competition is limited would largely eliminate this problem. As to the particular price ceiling that should be imposed, one benchmark would be to estimate, as best as possible, what nationwide firms would charge absent the abuse of market power.

A reasonable, enforceable, and easily-calculable ceiling the Commission could establish is one based on the average retail rates for a particular market. The average revenue per minute that a carrier obtains in any particular area serves as an easily quantifiable proxy for retail

pricing. For most nationwide carriers this information is readily available from financial reports.[33]

This proposed cap on wholesale rates has several obvious benefits. It would invariably leave a profit margin for the carriers, and it would not be difficult for the Commission to administer. The price ceiling would be determined by each carrier and would not require any oversight or complex review of costs. Moreover, there would be no need to review confidential or proprietary data concerning existing wholesale rates.

Because such a cap does not take into account customer acquisition, billing, and customer care costs, which a carrier incurs only when it provides retail services, this cap on wholesale roaming rates would necessarily be higher than the rate one would expect nationwide carriers to charge absent market power. In other words, such a ceiling rate would leave nationwide carriers with a considerably higher profit margin for providing wholesale roaming than they obtain from retail. That margin effectively ensures that this proposed cap would not discourage nationwide carriers from building out their networks or otherwise impede their ability to profitably provide mobile wireless services.

Currently, prevailing average retail per minute rates are $0.0563 for T-Mobile, $0.0649 for Sprint PCS and $0.0683 for Cingular.[34] While Verizon's financial statements do not provide the information necessary to calculate their average retail rates, Verizon's posted per minute retail rates go as low as $0.03 per minute for individual plans and $0.05 per minute for family

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[33] *See* Sprint Corporation Form 10-K, http://www.sprint.com/04ar/downloads/Sprint04arForm10KA.pdf; Cingular Wireless Form 10-K, http://cingular.com/investors; and T-Mobile financial statements http://www.telekom3.de/en-p/inve/home/cc-startseite.html. Where this information is not available from audited financial reports, the carrier's lowest prevailing per minute retail rates can be used as a proxy.

[34] *Id.*

plans.[35] Even assuming Verizon's average yield per minute is higher due to charges for excess minutes or a customer not using all the minutes in a package, and that the family plan rate is used as a proxy for Verizon's prevailing retail rates, under current market conditions, the price ceiling should range between $0.05 per minute for Verizon Wireless to $0.0683 per minute for Cingular. Prices that exceed that range are necessarily anticompetitive because they are so high as to cause a reduction in output and prevent regional carriers from serving some customer segments.

III. An Economic Model of the CMRS Market

This section presents and discusses a model based on the conditions present in the CMRS industry and concludes that there are strong incentives for nationwide carriers to set roaming charges so high as to foreclose competition from regional carriers. The model confirms the experience of regional carriers, namely, that nationwide carriers are likely to impose anticompetitive barriers to entry (*e.g.*, higher prices or an outright refusal to deal) in geographic areas where only one or two facilities-based carriers provide mobile wireless service of the same technological format.

What follows is a standard duopoly model modified to capture essential features of the wholesale market for roaming services. The economics literature on oligopoly model traces back to Cournot (1838)[36] and Bertrand (1883).[37] A key assumption of both the Cournot and Bertand models is that the oligopolists produce homogeneous goods. The Bertrand model assumes that the firms simultaneously choose prices and that consumers purchase from the firm with the

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[35] *See* http://www.verizonwireless.com/b2c/store/controller?item=planFirst&action=viewPlanDetail&sortOption=priceSort&catID=323&cm_re=Home%20Page-_-Personal%20Box-_-Individual%20Plans.

[36] Cournot, A., *Researches into the Mathematical Principles of Wealth*, 1838.

[37] Bertrand, J., "Review of Theorie Mathematique de la Richesse Sociale and Recherches sur les Principes Mathematicque de la Theoire des Richesse," *Journal des Savants*, 1883.

lowest price, or are evenly or randomly divided if the firms set the same price. Equilibrium in Bertrand oligopoly is characterized by prices being set equal to marginal costs.

In a Cournot oligopoly, firms first choose quantities, and price is set to clear the market. Equilibrium in Cournot oligopoly is characterized by the following condition

$$\text{(Price – Marginal Cost) / Price} = \frac{q_j / Q}{\varepsilon}$$

Where q_j is firm j's output, Q is total industry output (so that q_j / Q is firm j's market share) and ε is the elasticity of market demand. Unlike a Bertrand model, in a Cournot model the price cost margin, (Price – Marginal Cost) / Price, will fall as the number of competitors increase.

Neither the Bertrand nor Cournot model captures one of the more important features of oligopolistic competition in retail CMRS markets, namely that capacities are generally determined long before pricing decisions are finalized. The model that follows is a variation of Cournot and of Kreps and Scheinkman (1983),[38] which assumes that the oligopolists first choose capacities, that is, how much output that they can supply, and then with capacities fixed, they choose price. Because the Kreps-Scheinkman model has the feature that capacity decisions precede price decisions, this model is most appropriate for modeling the competition in the downstream market.

The following are the specific assumptions of this model.[39] First, the model assumes that there are two relevant markets: a home market (H) and an away market (A); and three firms: two nationwide carriers (N_1 and N_2) and a regional carrier (R). N_1 and N_2 provide facilities-based service in both markets, whereas R has facilities only in market H. It is assumed that all

[38] D. Kreps and J. Scheinkman, "Quantity Precommittment and Bertrand Competition Yield Cournot Outcomes," *Bell Journal of Economics*, 1983.

[39] The modeling approach is a variation of economic models of vertical foreclosure. *See* Patrick Rey and Jean Tirole, "A Primer on Foreclosure," forthcoming in the *Handbook of Industrial Economics III,* Mark Armstrong and Robert Porter (editors).

customers in market *H* want a set quantity of service in both markets, regardless of price.[40] *R* seeks to provide its customers with roaming capability in the away market, and it must obtain such service from either N_1 or N_2; *R* will acquire service in *A* from the firm that offers the lowest rates. The model thus characterizes competition between a regional carrier and two nationwide carriers in a region where the regional carrier is dependent on its nationwide rivals for roaming services. Absent a roaming agreement, the regional carrier can only offer a service which has limited features compared to the national service that nationwide carriers can provide.[41]

Competition between N_1 and N_2 can, depending on how the timing of decisions are modeled, have only equilibrium in which *R* is foreclosed, or have two equilibria—one in which roaming rates are at competitive levels and one in which *R* is foreclosed. First, if both N_1 and N_2 decide to provide service to *R* in market *A*, then it must be the case that both N_1 and N_2 set the rates at the marginal cost of providing that service. If N_1 and N_2 are simultaneously and independently choosing whether to offer *R* roaming, then neither nationwide operator can know what the other will choose. In this case, N_1's choosing a competitive roaming rate is a best reply to N_2 doing the same, and vice versa. However, N_1's choosing a foreclosure roaming rate can

[40] Given that there are undoubtedly some subscribers who do not want service outside market *H*, this model does not entirely mirror market conditions. However, as explained in the Appendix, this assumption does not affect the outcome. Further, this model assumes that while consumers are sensitive to rates, the demand for service in market *A* is constant—that is, they will use the same number of minutes in that market regardless of price. If that assumption is relaxed, then it is possible that other outcomes can arise. However, as is explained below, the results are not terribly sensitive to this assumption.

[41] This model also applies to in-market roaming, that is, the situation where one of the carriers has limited coverage in a BTA or CMA as compared to its rivals. In that case, the regional carrier will have the option of expanding coverage; this option is unavailable when the regional carrier only has spectrum licenses in a few areas. Note that price-discrimination in this case can have the effect of encouraging inefficient build-out. See Katz (1987).

also be a best reply to N_2's choosing a foreclosure rate, and vice versa. Economic theory cannot alone identify which equilibrium will result from this type of "coordination game."[42]

Market experience indicates that the nationwide carriers seemed to have arrived at the foreclosure equilibrium. This is not entirely surprising considering that it is never in the interest of either nationwide carrier to offer service to the regional carrier—or at least to offer such service at anything beside a prohibitively high rate—so long as the other nationwide carrier also does the same. In short, both N_1 and N_2 earn higher profits in foreclosure equilibrium than in a competitive equilibrium.

In practice, a nationwide carrier's decision whether to provide service to a regional carrier usually precedes the determination of price. If the decisions of N_1 and N_2 about whether to provide service to R in market A are modeled as separate decisions, there is a unique Nash equilibrium: neither N_1 and N_2 will be the first to offer the service.

One final observation about the foreclosure incentives in this model: they are relatively insensitive to variations in demand or costs. In particular, the foreclosure incentives are almost entirely derived from the benefits of reduced competition. Unless wholesale service to unaffiliated regional carriers is an important source of nationwide carriers' revenue as compared with revenue obtained from their own subscribers, nationwide carriers are unlikely to offer rates that would permit regional carriers to compete in markets in which the nationwide carriers provide facilities-based coverage but the regional provider does not.

To be sure, nothing in this analysis suggests that nationwide carriers should be barred from earning a reasonable return on their investment in the infrastructure needed to provide

[42] A "coordination game" is a non-cooperative game in which the players earn higher returns if they somehow, independently, arrive at compatible decisions. Such games tend to have multiple equilibria. (*See* Fudenberg and Tirole, *Game Theory*, MIT Press, 1991.)

mobile wireless service. The analysis indicates, however, that the factors governing the optimal wholesale rates do not depend on marginal, or historic, costs. Instead, the incentives derive entirely from revenue tradeoffs and the benefits of foreclosure.

IV. Conclusion and Recommendation

This paper began by explaining how nationwide carriers have adopted anti-competitive pricing practices in the market for wholesale roaming. The paper provided a model that explained the incentives for nationwide carriers to set wholesale roaming rates in such a manner and described why these practices are likely to harm consumers. Specifically, the increasing concentration of nationwide carriers and the incompatible technology that makes it infeasible for customers to use certain other networks has in many areas given rise to a duopoly in the provision of wholesale service. Although consumers in most markets have the choice of four or more CMRS carriers, that does not mean regional operators have four or more carriers from which they can obtaining wholesale roaming service. As a result of the duopoly within digital formats, nationwide carriers have the incentive and ability to foreclose regional carriers by charging much higher-than-competitive prices for roaming, or by refusing to offer such service at all. Under these conditions, regional operators will continue paying too much for roaming, and their customers will be denied service—unless the Commission intervenes.

As this report explains, wholesale rates that exceed retail rates can only be a product of misused market power; the cost of providing service is simply not a factor in setting rates. By charging rates that in some cases grossly exceed retail rates, nationwide carriers prevent regional carriers from serving customers who prefer the offerings of these regional carriers, but also want some ability to roam; the nationwide carriers essentially do not allow regional carriers to offer any practical roaming services. The customers who suffer most are those who roam occasionally

and want the services provided by regional carriers that are not available from nationwide carriers.

A reasonable and minimally intrusive way the Commission might respond to counteract harmful consequences of current pricing practices is to set on wholesale rates a cap that tracks the average rates nationwide carriers obtain for their retail minutes. Where audited information is not publicly available about average retail rates, the cap should be set by the lowest prevailing retail rates for a particular area.

More specifically, this paper recommends that the Commission adopt the following rules to counteract the incentive of nationwide carriers to engage in anticompetitive behavior with respect to pricing wholesale mobile wireless service:

- The Commission should require facilities-based carriers to furnish automatic roaming service upon the request of another carrier, including a facilities-based competitor, unless the facilities-based carrier adequately demonstrates to the Commission that the service is not compatible with or there is no available capacity on its network.
- Facilities-based carriers should be prohibited from discriminating against similarly-situated carriers in the rates charged for, or the terms and conditions of, roaming service.
- In areas where there are three or fewer facilities-based carriers from which the carrier seeking automatic roaming service could obtain such service, the Commission should prohibit a facilities-based carrier from demanding rates for automatic roaming that exceed that carrier's average retail revenue per minute for that area**.**

These provisions for setting a ceiling on wholesale rates are minimally intrusive and ensure that the ceiling would only increase total market penetration, usage, and consumer welfare.

APPENDIX: FORECLOSURE IN WHOLESALE CMRS MARKETS

In this Appendix, we outline a model of foreclosure in wholesale CMRS markets. We demonstrate that national carriers may find it profitable to foreclose regional carriers by refusing to provide roaming services to a regional carrier's customers (or, equivalently, by offering roaming services at sufficiently high prices so as to prevent the purchase of roaming services by the regional carrier's customers).

1. THE MODEL

Consider a market served by two national carriers, N_1 and N_2 (indexed by subscript i = 1, 2), each with a constant (marginal) capacity cost of providing CMRS services equal to c > 0. Suppose that a regional carrier (indexed by subscript r) must purchase roaming service from at least one of the national carriers in order to serve the market. Let $x = \text{Min}\{x_1, x_2\}$ denote the regional carrier's marginal cost of roaming service, where x_1 and x_2 are the prices of roaming service offered by the national carriers N_1 and N_2, respectively. The following derives the foreclosure incentives for the case of a linear demand in the market that is served by the two nationwide operators and the regional operator. The nationwide carriers are not competing with the regional firm outside of this market, and so their pricing decisions in those markets are unaffected by the outcome in market H.

In practice, the nationwide operators will set a wholesale per minute roaming charge, and R will set a separate retail roaming charge. In what follows, it is assumed that R does not mark-up (or down) the roaming charges and that roaming minutes are not sensitive to the roaming charges. For the purposes of this model, these assumptions only serve to simplify the exposition.

Assume the following linear (inverse) demand curve for the market for CMRS services:

$$(1) \qquad P = A - BQ$$

where the market output, $Q = q_1 + q_2 + q_r$ and P is the market clearing price for CMRS services. Assume that the parameters A and B > 0 and that A > c, the marginal cost of capacity for additional traffic on the network.

We assume Cournot competition. As Kreps and Scheinkman (1983) have shown, this model is, under certain conditions, equivalent to one in which firms first choose capacities, and then with capacities fixed choose prices.

Then, the regional carrier's profit is:

$$(2) \qquad \Pi_r = (P - x)q_r$$
$$= Aq_r - B(q_1 + q_2 + q_r)q_r - xq_r$$

And, each national carrier's profit is:

(3) $\Pi_i = (P - c)q_i + (x - c)z_i q_r \qquad i = 1, 2$
$= Aq_i - B(q_1 + q_2 + q_r)q_i - cq_i + (x_i - c)z_i q_r \qquad i = 1, 2$

where z_i is the fraction of roaming service purchased by the regional carrier's customers that is provided by national carrier i ($z_1 + z_2 = 1$).

1.1 EQUILIBRIA

There are potentially two pure strategy equilibria in the model.[1] In the first pure strategy equilibrium, the "equilibrium without foreclosure," the national carriers sell roaming service to the regional carrier. In the second pure strategy equilibrium, the "equilibrium with foreclosure," the national carriers do not sell roaming service to the regional carrier.

Remark 1: In any equilibrium without foreclosure, $x_1 = x_2 = c$.

Proof of Remark 1: First, note that $x_1 = x_2$ in any equilibrium without foreclosure. (If $x_1 > x_2$, then NC2 can charge $x_1 - \varepsilon$ (where $\varepsilon > 0$) and increase profits, and vice versa.) Second, if $x_1 = x_2 > c$, then each national carrier will find it profitable to undercut the other national carrier's roaming service price slightly in order to capture the market for roaming service. Hence, in any equilibrium without foreclosure, $x_1 = x_2 = c$. ■

Remark 2: The equilibrium with foreclosure is more profitable for the national carriers than the equilibrium without foreclosure.

Proof of Remark 2: We compute the profit for the national carriers in each type of equilibrium.

First, in an equilibrium with foreclosure, equation (3) reduces to:

(4) $(P - c)q_i \qquad i = 1, 2$
$= Aq_i - B(q_1 + q_2 + q_r)q_i - cq_i \qquad i = 1, 2$

The first-order conditions for an equilibrium imply that each national carrier's best-response function is:

(5) $q_i = (A - c - Bq_j) / 2B \qquad i \neq j = 1, 2$

The equilibrium output for each national carrier is:

(6) $q_1 = q_2 = (A - c) / 3B$

The equilibrium price is:

(7) $P = (A + 2c) / 3$

And, each national carrier's profit is:

[1] We ignore mixed strategy equilibria.

(8) $\Pi_i = (A - c)^2 / 9B \qquad i = 1, 2$

Second, in an equilibrium without foreclosure, the first-order conditions for an equilibrium imply that each national carrier's best-response function is:
(9) $q_i = (A - c - B(q_j + q_r)) / 2B \qquad i \neq j = 1, 2$

and the regional carrier's best-response function is:
(10) $q_r = (A - x - B(q_1 + q_2) / 2B$

From Lemma 1, we know that in any equilibrium without foreclosure, x1 = x2 = c. Thus, the regional carrier's best-response function becomes:
(11) $q_r = (A - c - B(q_1 + q_2) / 2B$

The equilibrium output for each firm is:
(12) $q_1 = q_2 = q_r = (A - c) / 4B$

The equilibrium price is:
(13) $P = (A + 3c) / 4$

And, each national carrier's profit is:
(14) $\Pi_i = (A - c)^2 / 16B \qquad i = 1, 2$

Since, $(A - c)^2 / 9B > (A - c)^2 / 16B$, each national carrier's profit is higher in the equilibrium with foreclosure than in the equilibrium without foreclosure. ■

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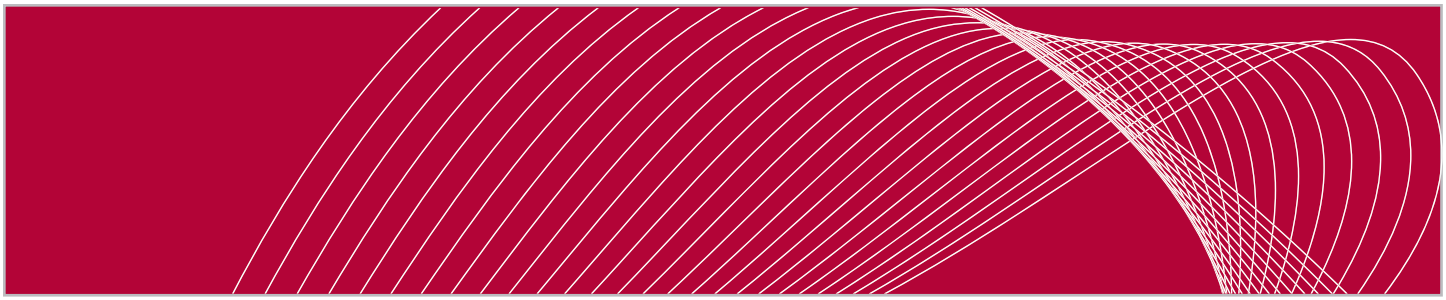

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Reexamination of Roaming Obligations of	)	WT Docket No. 05-265
Commercial Mobile Radio Service Providers	)	

COMMENTS OF LEAP WIRELESS INTERNATIONAL, INC.

Attachment B

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Reexamination of Roaming Obligations of	)	WT Docket No. 05-265
Commercial Mobile Radio Service Providers	)	

DECLARATION OF ROBERT J. IRVING, JR.

I, Robert J. Irving, Jr., hereby declare under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge, information and belief:

1. I am the Senior Vice President and General Counsel of Cricket Communications, Inc. ("Cricket"), a subsidiary of Leap Wireless International, Inc. ("Leap"). I am also the Senior Vice President and General Counsel of Leap. In these capacities, among other responsibilities, I am personally familiar with Leap's spectrum and operating market portfolio and with Leap's general business relationships with other wireless industry carriers and suppliers. I am involved in Leap's negotiation of a variety of commercial agreements, and I am familiar with Leap's automatic roaming agreements, including its roaming agreements with nationwide Commercial Mobile Radio Services ("CMRS") carriers.

2. Leap, through Cricket, was one of the first mobile wireless service providers to offer consumers unlimited mobile wireless services within in a local service area for a reasonable flat monthly rate and without requiring customers to enter a long-term contract, to meet credit standards, or to agree to pay early termination charges. Leap has established itself as a leading provider of high-quality, low-cost mobile wireless service.

3. As of September 30, 2005, Leap served approximately 1.62 million customers in 19 states. Leap has a unique customer base of traditionally under-served customers: 69 percent of Leap's subscribers have household incomes of less than $35,000 per year, and 40 percent are Hispanic or African-American. The usage patterns of Leap's customers are also vastly different from those of other carriers: The average Leap customer uses approximately 1,450 minutes per month (nearly an hour a day, every day). Indeed, approximately half of Leap's customers have "cut the cord" and abandoned their landlines altogether. Ninety percent use Leap as their primary phone service.

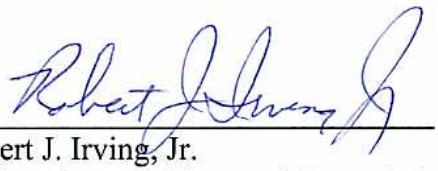
4. Historically, Leap's core Cricket services did not include the ability for subscribers to roam. Rather, the Cricket offering was designed to resemble the simplicity and predictability of landline service, with an unlimited supply of minutes for one flat fee while in the local market area. Recently, however, Leap and Cricket have sought to expand Cricket's service offerings to provide customers with occasional roaming capabilities. In June, 2005, Leap announced the roll out of its Travel Time™ roaming service, a product designed for the occasional roamer to use Cricket phones across the United States on a prepaid basis. Currently, Cricket customers can

sign up for 30 minutes of Travel Time per month for a $5 monthly recurring charge with airtime above 30 minutes deducted from their "Flex Bucket" account at $0.59 per minute.

5. As Leap has sought to add roaming capabilities for Cricket customers, it has experienced difficulty in negotiating reasonable terms for roaming contracts, in particular with large wireless carriers. The average rate that Cricket is charged by large carriers for automatic roaming service is $0.28 per minute, with the highest rates exceeding $0.40 per minute. In many markets Leap has had to pay these rates because there are no other carriers from which it could obtain automatic roaming service. By contrast, the average rate Cricket pays for roaming services from small and rural carriers is $0.07 per minute.

6. Indeed, as an example of the types of discriminatory behavior that Leap has encountered, one large carrier charges *increasing* rates for roaming the *more* that Cricket customers use that carrier's network.

7. Cricket customers are harmed by such practices. Due to their credit-challenged status, many Cricket customers do not have credit cards, meaning that manual roaming for such customers is not an option. And the only competitive choices that many Cricket customers who desire roaming have are MVNO and prepaid wireless services offerings, which generally are more expensive than Cricket services. Cricket could and would pass on additional, significant savings to its subscribers if it could obtain reasonable wholesale roaming rates from large carriers.



Robert J. Irving, Jr.
Senior Vice President and General Counsel
Leap Wireless International, Inc.
Cricket Communications, Inc.

November 28, 2005

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Reexamination of Roaming Obligations of	)	WT Docket No. 05-265
Commercial Mobile Radio Service Providers	)	

COMMENTS OF LEAP WIRELESS INTERNATIONAL, INC.

Attachment C